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# UK Patent Application GB 2 208 003 A

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GB A 2103807 GB 1551611 EP A2 0145160  
WO A1 87/02577 US 3998209 US 3089130

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(58) Field of search

A5K

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A61F

## (54) A snore-preventive pillow

(57) A snore-preventive pillow comprises a microphone (17) connected to an electronic system (18) having a low-pass filter and a band-pass filter by means of which the onset of snoring by a pillow user is identified. When snoring is detected an electric motor (3) is driven causing a body cover (12) to be moved up and down since the body cover is connected to gear means (4-11) rotating together with the motor (3). Consequently, the location of the users head is changed causing the user to stop snoring.

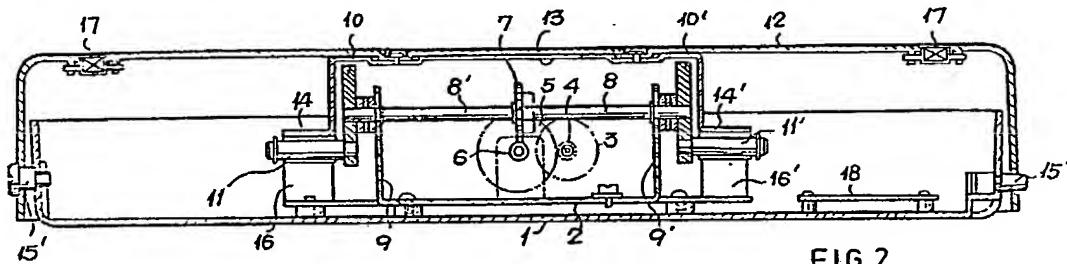


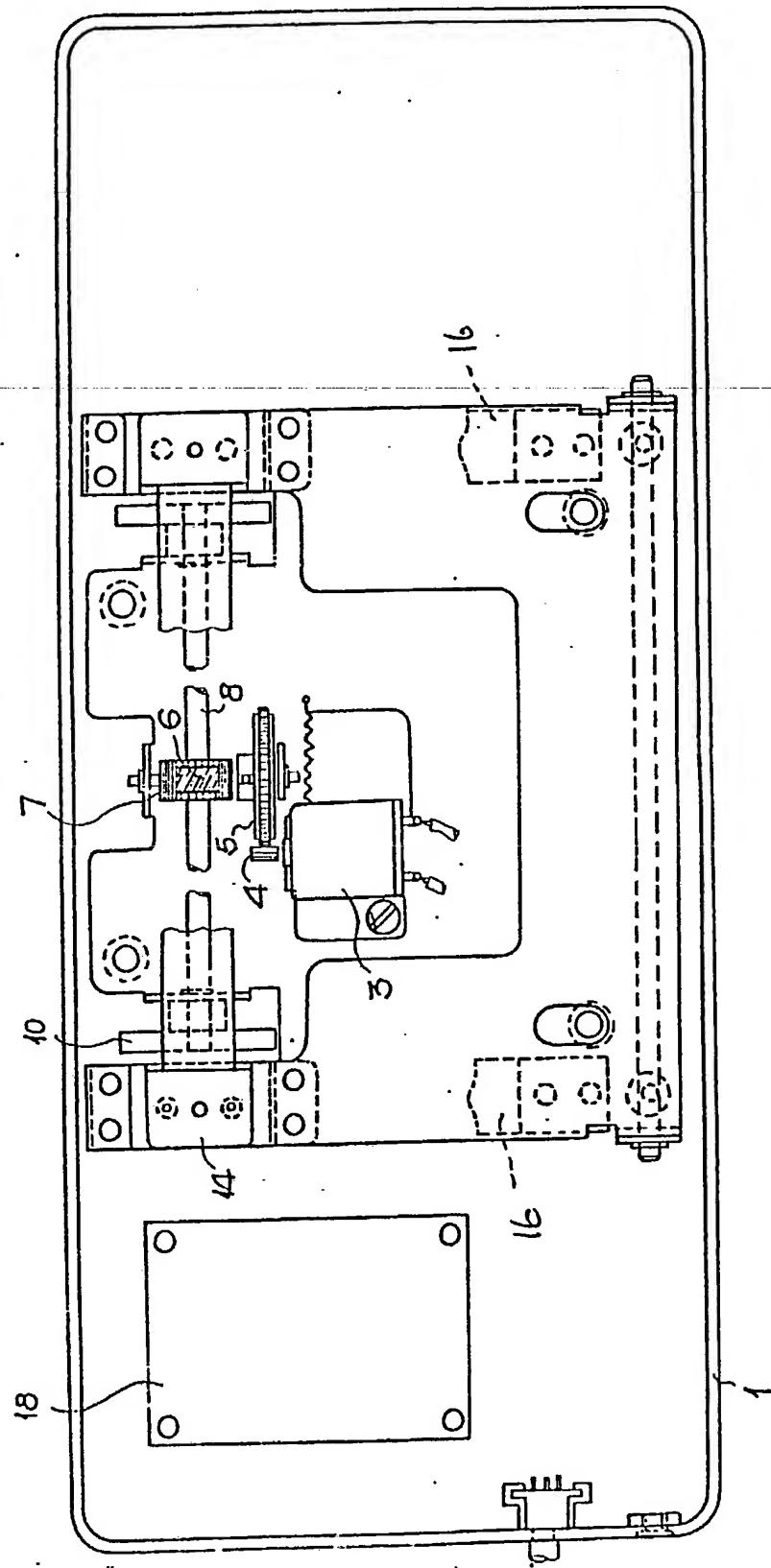
FIG.2

GB 2 208 003 A

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FIG.1



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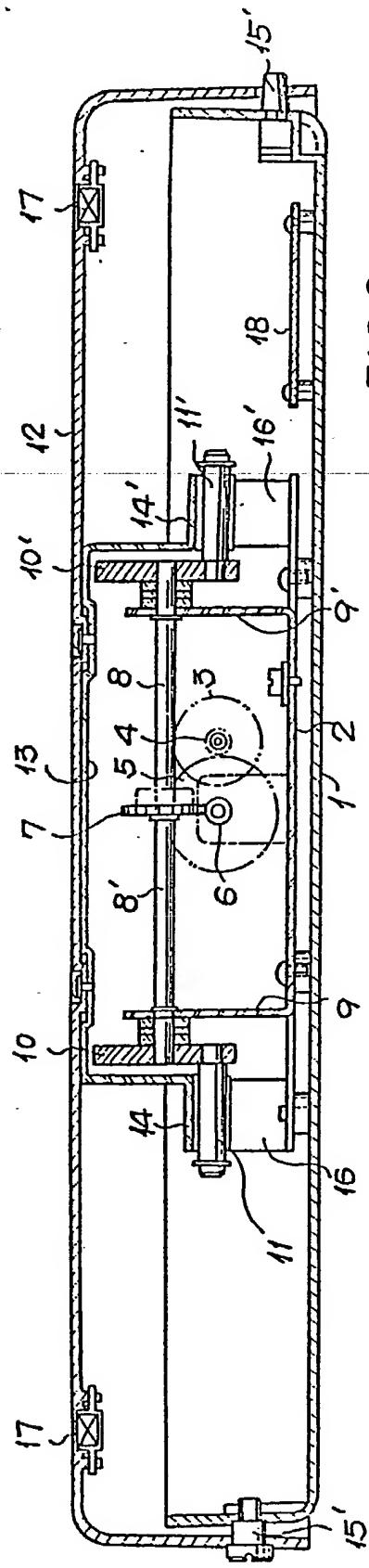
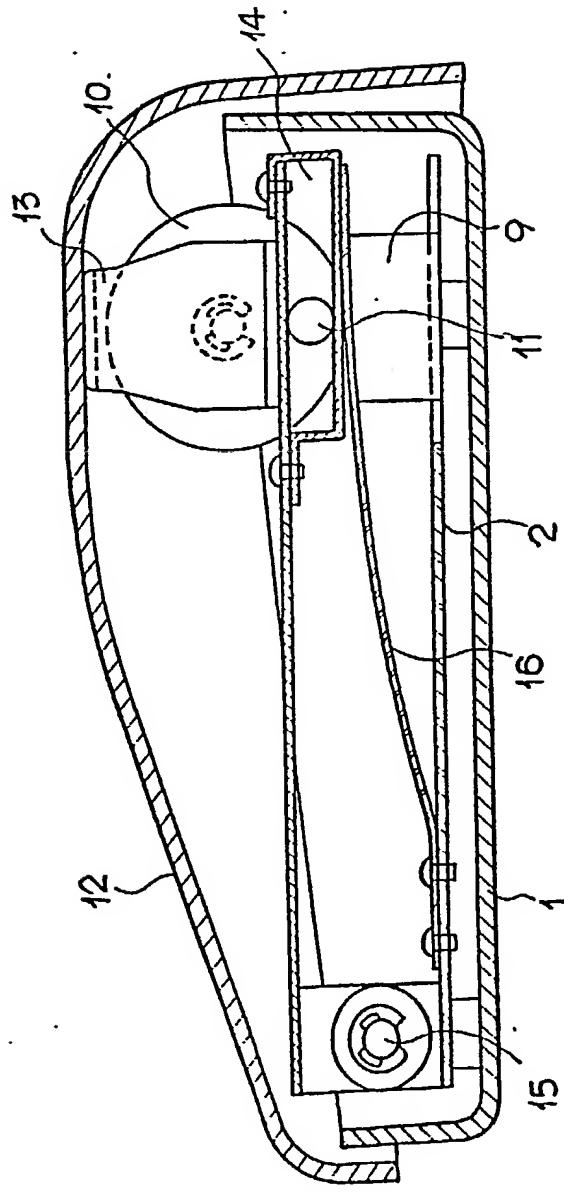


FIG. 3



A snore-preventive pillow

This invention relates to a pillow which seeks to prevent prolonged periods of snoring by a user when sleeping.

One hitherto commonly-used snoring-preventive apparatus has been a wrist band. The prior art wrist band comprises an electronic device which detects the onset of snoring and generates an electrical pulse. The pulse is fed to the wearer as an electric shock which stimulates a muscle in the wearer and causes the snoring to stop. A wrist band that generates an electric shock has a disadvantage that the user can be injured thereby.

This invention seeks to overcome the disadvantage of such a known wrist band.

A snore-preventive device according to one aspect of this invention comprises a pillow including at least one vibration-sensitive transducer for detecting vibration created by a user snoring, an electronic system receiving the output from the transducer and having a low-pass filter and a band-pass filter for identifying the presence of snoring-induced output and generating, in response thereto, an electrical signal for driving a motor, and gear means driven by said motor for mechanically changing the location of the head of the user on the pillow for stopping snoring.

Suitably the electronic system and gear means cause the pillow, together with the user's head, to slant from front to back and vice versa, whereby snoring is stopped.

According to a further aspect of this invention, a snore-preventive pillow comprises a pillow body, a body cover pivotally connected to the body at opposing side walls of the body, a frame having upwardly extending

supporting plates and being fixed to the body, a shaft rotatably and perpendicularly mounted on the support plates at both ends thereof, a worm wheel fixed to the shaft, revolving members having pins eccentrically formed thereon and fixed to both ends of the shaft, a connecting plate engaging pin holders with pins and fixed inside the body cover, gears with a worm wheel being connected to a motor, and an electronic system sensitive to the vibration generated by snoring and changing the vibration caused by snoring into electric power.

The electronic system which is a component of the present invention comprises a low-pass filter and a band-pass filter through which only snoring of low frequency is detected and changed into the electrical signal required for driving the motor. Upon driving the motor, the shaft with the revolving members and the pins will be rotated and accordingly, the pins will pivotally move the body cover in a limited degree from front to back and vice versa. This pivotal movement causes the user's head and neck to be moved theretogether, whereby snoring is at least temporarily arrested.

A better understanding of the present invention will be obtained by reference to the following detailed description when read in conjunction with the accompanying drawings, wherein like reference characters refer to like parts throughout the several views, and in which:

Figure 1 is a plan of a pillow according to this invention, from above, with the body cover removed:

Figure 2 is a transverse cross-sectional view of the snore-preventive pillow of Figure 1, and

Figure 3 is a longitudinal sectional view of the snore-preventive pillow of Figure 1.

Referring to the drawings, a body 1, open at the upper part thereof, houses a frame 2. On the frame 2 are mounted an electric motor 3, a small gear wheel 4 fixed to a shaft of the motor 3, a large gear wheel 5 meshing with the small gear wheel 4, a worm 6 having its central axis approximately aligned with the central axis of the large gear wheel 5, and a worm wheel 7 meshing with the worm 6.

Shafts 8, 8' extending through the worm wheel 7 are rotatably mounted in supporting plates 9, 9'. The supporting plates 9, 9' extend upwardly from a base part of the frame 2. Revolving members 10, 10' are respectively attached to opposite ends of the shafts 8, 8'. Each of the revolving members 10, 10' has an eccentric 15 pin 11, 11' . Each pin engages a corresponding pin holder 14, 14' which has an elongate opening at the top thereof. A connecting plate 13 fastened to a body cover 12 has outwardly extending flanges which define the pin holders 14, 14'.

20 The pins 11, 11' slidably engage the pin holders 14, 14'. The body cover 12 covering the open top of the body 1, is higher at the back part thereof than at the front (see Figure 3).

The connecting plate 13 is located inside the body 25 cover 12 towards the rear thereof, the front end of the cover 12 is movably mounted on the body 1 about pivots 15'. Accordingly, rotation of the revolving members 10, 10' together with the pins 11, 11' causes the connecting plate 13 to be moved up and down. The front edge 30 of the plate 13 is pivotally connected to the frame 2 at 15 as shown.

Panel springs 16, 16' are fixed to the frame 2 at one of their ends and their free ends press upwardly

against the bottom of the pin holders 14, 14'.

The body cover 12 may be used with or without a fabric or other pillow cover.

At least one microphone 17 is provided inside the 5 pillow to detect the onset of snoring. The vibrations caused by the user of the pillow starting to snore are detected by the transducer 17 and are converted into electric power by means of an electronic system schematically represented by the plate 18 (e.g. a printed circuit).  
10 The electronic system 18 identifies snoring of low frequency by means of a low-pass filter and a band-pass filter therein and drives the electric motor 3.

When the electric motor 3 is driven, the worm wheel 7 will rotate together with the small gear wheel 4, the 15 large gear wheel 5 and the worm 6, whereby the revolving members 10, 10' will rotate.

The rotation of the revolving members 10, 10' causes the eccentric pins 11, 11' to be turned about the central axis of the revolving members. At that time, the pins 20 11, 11' engaging slidably inside the pin holders 14 cause the connecting plate 13 to be pivotally moved up and down which in turn raises and lowers the cover 12 at the back part thereof.

The panel springs 16, 16' control the above rotation 25 and aid in balancing the weight of the user's head on the pillow.

The pivotal movement of the connecting plate 13 causes the body cover 12 to be moved in the same direction thereas. Therefore, height and inclination of the pillow 30 are changed thus changing the location of the user's head mechanically, whereby the condition of the throat

of the user is changed thus arresting snoring.

When snoring is no longer detected, the pivotal movement of the pillow ceases since energisation of the motor 3 via the system 18 ceases. Should the user again 5 start to snore the motor 3 will again rotate in the above-described way and reposition the cover 12 until snoring again ceases.

Many modifications to the arrangement illustrated will become apparent to those skilled in the art without 10 deviation from the scope of the invention as defined by the following claims. For example, one pin 11' can be provided at the revolving member 10' diametrically opposed to the other pin 11 crossing the axis of the shaft 8', and the body 1 and the body cover 12 have connections at the front and the back walls of the body 1. 15 In this case, the body cover 12 rocks from left to right and vice versa upon energisation of the motor 3.

Battery means could be provided in the pillow or it could be powered from an external supply via the power 20 lead and plug partially shown in Figure 1.

CLAIMS

1. A snore-preventive pillow comprising at least one vibration-sensitive transducer for detecting vibration created by a user snoring, an electronic system receiving the output from the transducer and having a low-pass 5 filter and a band-pass filter for identifying the presence of a snoring-induced output and generating, in response thereto, an electrical signal for driving a motor, and gear means driven by said motor for mechanically changing the location of the head of the user on the pillow for 10 stopping snoring.

2. A pillow as claimed in claim 1, in which the gear means cause a body cover of the pillow to be pivotally moved up and down, whereby the height and the inclination of the body cover of the pillow relative to a base 15 thereof are changed.

3. A snore-preventive pillow comprising a pillow body, a body cover pivotally connected to opposing side walls of said body, a frame fixed inside said body, supporting plates upwardly extending from said frame and 20 opposing each other, a shaft having a worm wheel, revolving members mounted on both ends of said shaft and having eccentric pins formed thereon respectively, connecting plates fixed to said body cover, pin holders being formed at the ends of said connecting plates and having sliding- 25 ly engaging pins, a worm meshing with said worm wheel, gears being connected to said worm and said worm wheel, a motor driving said gears, and an electronic system for identifying snoring, and for energising said motor, thus changing the height and/or the inclination of said 30 body cover relative to said body to stop snoring.

4. A snore-preventive pillow as claimed in claim 3, wherein each connecting plate is resiliently supported by a panel spring which is fixed to said frame at one end thereof.

5. A snore-preventive pillow as claimed in claim  
3 or claim 4, wherein said body and said body cover are  
pivotally connected to the opposing side walls of said  
body, said pins are eccentrically mounted on said revolv-  
5 ing members, said revolving members and said connecting  
plates are mounted in said pillow body thus causing the  
back of said body cover to be moved up and down upon  
energisation of said motor.

6. A snore-preventive pillow as claimed in any  
10 one of claims 3 to 4, wherein one of said pins is provided  
at one of said revolving members diametrically opposed  
to the other pin and crossing the axis of said shafts,  
and said body and said body cover have connections at  
front and back walls of said body, whereby said pillow  
15 slants from left to right and vice versa upon driving  
of said motor.

7. A snore-preventive pillow substantially as here-  
inbefore described with reference to, and as illustrated  
in, the accompanying drawings.